

HIGH QUALITY WATER ALTERNATIVES ANALYSIS

II. Alternatives Analysis

1. Has discharge to other treatment works been investigated?

There are treatment facilities for other surface mines in the area but are located in watersheds that would not intercept runoff from the proposed mine. There are no municipal or other treatment facilities within 8 miles of the proposed mine. The nearest downstream municipal system is located at Hazard, KY about 15 miles from the permit area.

To capture the runoff and divert the water through pipes to the Hazard Municipal treatment systems would require the laying of pipe for almost 15 miles. The cost to lay pipe of sufficient size and at sufficient depth and to cross the streams and roads to get to Hazard would average \$10/foot (\$5/ft for materials and \$5/ft. for installation) and would cost $10(15)5280 = \$792,000$. This cost would offset the net income expected from this mining. Catch basins with drop inlets would also be needed to capture the runoff and channel the water into the sewer lines. These structures would cost at least another \$10,000 to 20,000.

To intercept the runoff from the proposed mining area and get it to other surface mine treatment facilities in the area would require either capturing the runoff and pumping it into a truck to be hauled to the treatment facility or capturing the runoff and pumping it into waterlines to carry the runoff to the treatment facilities at other surface mines. The average runoff over a year for an acre of forested land in Letcher Co. is $36/12(.73) = 2.19$ acre/feet.

36" average rainfall
73% average runoff

There are 325,851 gallons of water in an acre/foot. The discharge points associated with this surface mine captures 72 acres. The ponds will be treating $317(2.19)(325,851) = 51,380,185$ gallons of water per year. According to the Agriculture Dept. it costs \$42 to pump 325,851 gallons. It would cost the applicant $42(51,380,185/325,851) = \$66230/\text{year}$ to pump the runoff from this permit area. The cost to pump the runoff from this mine to other facilities would far exceed the income expected from the mining of the coal. The topography of this area would limit the ability to pump water to other treatment facilities. The topography of this area is very steep with the landscape dissected by many valleys and ridges, which would have to be crossed before treatment at other mines would be reached. The difference in elevation between the valley floor and ridgelines is on average 250 feet. To cross these valleys and ridges with water lines lift stations would have to be installed, which would add to the cost of pumping the water.

Another option that was considered was trucking the water to be treated to the municipal Hazard water treatment facility. This facility is located approximately 15 miles from the discharge points. The runoff would first have to be captured, this would involve constructing ponds to capture the runoff. It would cost at least \$10,000 to construct a pond with the capacity required to hold the runoff before trucking. After capturing the runoff the water would need to be pumped into trucks. According to the Agriculture Dept. it costs \$42 to pump 325,851 gallons. It would cost the applicant $\$42(51,380,185/325,851) = \$6623/\text{year}$ to pump the runoff into trucks. The trucks would then carry the water to the treatment facility in Hazard. The runoff from the mine will generate approximately 621,000 gallons per day. The capacity of a truck to carry the water to the treatment plant is 2500 gallons if the weight limit for the truck is 21,000 lbs. The number of trips required by a truck with this capacity would be $621,000/2500 = 248$. The number of miles for the 248 trips would be $30(248) = 7440$. The cost per mile for this size truck is approximately .75/mile or $7440(.75) = \$5580/\text{day}$ or $364(\$5880) = \$2,031,120/\text{year}$. These costs would exceed the anticipated profit from the mine.

2. Have other discharge locations been evaluated?

The nearest alternative to the proposed discharge points in Bull Creek and Upper Lick Fork are other high quality streams that are separated from these watersheds by steep ridges. The top of the ridge is 200 feet above from the valley floor. In order to capture the runoff from Bull Cr. and Upper Lick Fork and pump it to another watershed would require constructing a detention facility that would cost at least \$100,000 to be of sufficient size to hold the expected runoff before it could be pumped. Waterlines and lift stations would be required to transport the water from these streams and into another watershed that are also high quality water. The expected daily flow from these streams is approximately 141,000 gallons. To construct the water lines and lift stations to pump the water to another watershed would cost \$5 per foot $(5)(2200) = \$11,000$. To pump the 141,000 gallons at $\$30/325851\text{gallons}$ would be \$13 a day. A treatment facility in another watershed would also be required at an expected cost of \$10,000. The total cost over the first year would be approximately \$25,000. The cost to pump water from these streams to another watershed would be greater than the profit margin expected from the mining of the coal so this alternative was eliminated.

3. Has water reuse or recycle been investigated as an alternative to discharge?

In order to reuse or recycle the water, the only viable option is to use it to spray over the backfill to promote vegetative growth or dust suppression. The runoff captured by the proposed ponds will be used for dust

suppression on the mine. The runoff captured by the proposed ponds will also be used to fill the hydroseeder when seeding the reclaimed areas. The reuse of the runoff for dust suppression and filling the hydroseeder would be less than 5% of the total runoff.

4. Have alternative process or treatment options been evaluated?

The proposed surface mining is considered the only option safe and feasible process for the mining. The areas proposed for mining are too close to the outcrop to safely allow processing by underground mining. To safely mine coal by underground methods there should be 100 feet of overburden above the coal, otherwise it is extremely difficult to prevent roof falls.

Two solutions present themselves for the treatment/removal of sediment from surface water;

- a. Filtration, and
- b. Settlement

Filtration would still require getting the water to a central location and holding it until it could be passed through a filtering system. That system would be costly to construct and maintain. Sediment removed from the water would have to be hauled to some location for disposal, requiring dedicated equipment and the associated maintenance and operating costs. Rainfall during the period that vegetative growth was being established on the disposed sediment would carry part of the sediment back to the filtration system, thus creating a loop of rehandling material. The topography of the area is very steep with narrow valleys and steep sideslopes. This topography would require a very large amount of material to be excavated and regraded to construct a filtration facility. The cost to construct such a facility would be at least \$400,000. Such a treatment facility would also be of no use or value in this remotely populated area of Letcher. There would also be a cost of decommissioning the plant, which is estimated at a minimum of \$30,000. For these reasons, this option was eliminated from consideration.

The settlement of the silt contained in the runoff with silt structures that capture the runoff is the treatment facility that has been chosen for this mine. This is the most economical way to treat the runoff. It would cost approximately \$10,000 to construct each pond. To maintain the ponds over the life of the permit is approximately \$1000 a year. Another advantage of settlement is that you are capturing the pollutant at the nearest point to the source. For these reasons settlement has been chosen as the means of treatment for this operation.

5. Have on-site or subsurface disposal options been evaluated?

Subsurface disposal would entail allowing the water to run into underground mines in the area or drilling holes from the surface to underground mine voids. There are no underground mine voids within 0.5 miles of the proposed operation. To capture the runoff expected from this would require constructing a detention facility. The facility would have to hold at least the runoff from three days which is expected to be about once acre/foot. To capture the runoff from Bull Cr. would require the construction of a facility at a cost of approximately \$250,000. To then pump the water 0.5 miles to the underground mine would cost at least \$7 a foot or \$18,480. To pump water it costs \$30/acre foot per day or = \$4730/year. This would exceed the amount of profit expected by mining the coal so this option was eliminated.

The amount of runoff expected from this operation is 51,000,0000 gallons of water a year. To capture this runoff and dispose into the subsurface would require building ponds to capture the runoff and drilling wells. If you have to build ponds to capture the water, there is no point in then pumping the water into wells. To pump the water after being captured in the ponds would cost \$4730/year. The cost of ponds to capture the runoff would cost at least \$50,000. The subsurface in this area is shale, sandstone, clay and coal that has a high cohesion and a small pore space. The available pore space to accommodate the runoff from this site is insufficient to inject the runoff into wells, so this option was eliminated from consideration.

On-site disposal entails the information given in question 4 regarding settlement. This is the method chosen for this project.

6. Have any other alternatives to lowering water quality been evaluated?

The discharge to other surface mine treatment facility in the area was considered.

To intercept the runoff from the proposed mining area and get it to other surface mine treatment facilities in the area would require either capturing the runoff and pumping it into a truck to be hauled to the treatment facility or capturing the runoff and pumping it into waterlines to carry the runoff to the treatment facilities at other surface mines. The average runoff over a year for an acre of forested land in Letcher Co. is $36/12(.73) = 2.19$ acre/feet.

36" average rainfall
73% average runoff

There are 325,851 gallons of water in an acre/foot. The discharge point associated with this surface mine captures 72 acres. The ponds will be treating $72(2.19)(325,851) = 51,000,000$ gallons of water per year. According to Agriculture Dept. it costs \$30 to pump water 325,851 gallons. It would cost the applicant \$4730/year to pump the runoff from this permit area. The cost to pump the runoff from this mine to other facilities would far exceed the income expected from the mining of the coal. The topography of this area would limit the ability to pump water to other treatment facilities. The topography of this area is very steep with the landscape dissected by many valleys and ridges, which would have to be crossed before treatment at other mines would be reached. The difference in elevation between the valley floor and ridgelines is on average 250 feet. To cross these valleys and ridges with water lines lift stations would have to be installed, which would add to the cost of pumping the water.

Methods to keep from discharging water are discussed in questions 3 and 5 and were found to not be viable options for this project. If water quality is lowered as a result of discharging from this project, the effects will be relatively short term. Reclamation is required to be maintained within a reasonable time and distance behind active operations, thus minimizing the amount of disturbed ground to produce maximum sediment. Effluent from sediment structures is required to meet minimum levels, and the ponds on this project are designed to result in levels well below the maximum limits.

The applicant could also choose not to mine the area so that lowering water quality could be avoided. The applicant has been in the mining industry for over 25 years. In order to keep the company operating coal reserves must be found and permitted. The applicant could choose to quit mining but the employees would have to be laid off and the mining equipment sold. The applicant has chosen to continue mining and thus must be trying to find coal reserves that can be economically mined. The research that the applicant has undergone to find the area now proposed to be mined is considerable. Land owners had to be contacted and exploration also had to be completed. If the applicant were to choose not to mine the area the 40 to 60 employees that the applicant has would have to be laid off. This layoff would result in \$2,400,000 to \$3,600,000 in lost wages and benefits. The layoffs would also be harmful to the families of the employees of the applicant. The employees would have to find new jobs or temporarily receive unemployment. Most of the employees live in Letcher county, which is one of the poorest counties in the nation, the social impact to this county would be harmful.

The applicant could accept more stringent limitations on the effluent. The cost of additional monitoring and engineering to comply with the

standards would be cost prohibitive. The ponds would have to be much larger, baffles in the pond pools would have to be installed to inject chemicals into the pond for treatment would be required. To make the ponds larger, conduct additional monitoring and conduct chemical treatment to the six ponds now proposed would add at least \$10,000 per pond to the cost of the operation, which would then make the cost of the project a much less profitable mine. The more stringent limitations are considered not feasible.

III. Socioeconomic Demonstration

1. State the positive and beneficial effects of this facility on the existing environment or a public health problem.

There has been considerable logging activities and mining in the area where the mining is proposed. The mining areas, logging roads and skid trails have poorly developed vegetation and the runoff from these areas is washing sediment into the receiving streams. The proposed mining will reclaim the previous mining, logging roads and skid trails by establishing vegetation. The ponds proposed will catch the runoff from these areas allowing silt to settle. The mining should result in a positive impact to the receiving water by reclaiming the previous mining, logging roads and skid trails created by the logging operation.

2. Describe this facility's effect on the employment of the area.

This project will directly employ 29 hourly and 2 salaried individuals. The average rate of pay for these employees will be \$19.50/hour or \$40,560/year, without overtime. According to Wikipedia.org the median income for males in Letcher Co. is \$30,488 and for females is \$17,902. The jobs created by this project will pay at least 25% more than the average pay expected from other employment in Letcher Co. The income created for the individuals employed by this project will raise the quality of life for these individuals. This project will obviously have a beneficial effect on the employment in Letcher Co. The current unemployment rate for Letcher Co. is 12.7%. The area needs all the employment opportunities available.

3. Describe how this facility will increase or avoid the decrease of area employment.

In addition to the 31 jobs provided by this project, it will also provide more employment indirectly in mining service jobs. Studies indicate that the mining industry create 3 indirectly related jobs for each actual direct

mining position.* These jobs include equipment sales, mining engineering consultants, food service, fuel sales, transportation, coal washing and blending.

*Source: university of Kentucky Center for Business and Economic Research: Economic Impact Analysis of Coal in Kentucky, (1995-2004) by Haywood and Baldwin.

4. Describe the industrial or commercial benefits to the community, including the creation of jobs, the raising of additional revenues, the creation of new or additional tax bases.

The mining industry directly contributes to Letcher's economy through real taxes, personal property taxes and the state severance tax. The severance tax for coal is 4.5% of which 50% is slated to be returned to the county of origin. In 2006 Letcher Co. received \$2.0 million in severance taxes, which have been used for education, health services, judicial services and infrastructure projects including water and sewer service expansion, industrial site development, and recreational and cultural improvements. This project will mine approximately 500,000 tons per year for the next four year. The severance tax paid on this coal will be partially returned to Letcher Co. Letcher Co. has a poverty rate of 27% and these additional revenues will help to alleviate problems in the county.

5. Describe any other economic or social benefits to the community.

The mining will pay severance tax, part of which will be returned to Letcher County. The severance tax paid by coal companies mining in Letcher Co. in the fiscal year 2006/2007 was \$18,000,000. The severance tax money will be used to improve roads, and extend water and sewer lines, which will improve the lives of the citizens of Letcher Co. The secondary economic benefits to the community include maintenance of some of poorly maintained public roads that the applicant will utilized when hauling the coal from the mine to the tipple.

10. How many households will be impacted by this project?

Total employment will be approximately 31. Therefore, the project will impact about 31 households. Approximately three times or 93 other households will be indirectly affected by the proposed mining.

11. How will those households be affected?

This project will directly employ 29 hourly and 2 salaried individuals. The average rate of pay for these employees will be \$19.50/hour or \$40,560/year, without overtime. According to Wikipedia.org the median income for males in Letcher Co. is \$30,488 and for females is \$17,902. The jobs created by this project will pay at least 25% more than the average pay expected from other employment in Letcher Co. The \$40,000 in wages and benefits that each of the 29 employees receives will be a beneficial impact. These wages will enable each employee to purchase food, clothing and housing for their families. The wages will also allow the employees to send their children to college or at least not have to borrow as much if the wages were not being paid. The benefits provided by the applicant include health insurance, which allows the employee and family to obtain medical services when they are sick. The wages also allow the employees to contribute to charities if they choose. Letcher county has an unemployment rate of 12.7% and the poverty rate is 27%. This project not only provides employment opportunities, but helps to reduce the poverty rate of the county.

12. Does this project replace any other methods of sewage treatment to existing facilities? No. The project does not replace any other methods of sewage treatment to existing facilities.

13. Does this project treat any existing sources of pollution more effectively? Yes. The project area includes areas disturbed by logging that have no vegetation and no silt control. The project will vegetate these roads and establish ponds that will control silt generated by the roads.

14. Does this project eliminate any other sources of discharge or pollutants?

The logging roads that exist within the project area have disturbed approximately 5 to 10 acres. The mining operation will revegetate the areas disturbed thus eliminating a source of pollution.

15. How will the increase in production levels positively affect the socioeconomic condition of the area?

The tons of coal to be mined in the permit area is approximately 2,000,000. The expected life of the mining is 5 years. The 2,000,000 tons of coal mined over the 5 years should produce \$20,000,000 of revenue for 5 years. Increased production levels lead to increased revenues for both public and private entities. Additional taxes will be made available to local government. The additional taxes will provide water and sewer lines and improve roads and schools locally. Additional income will be available to private citizens by the purchasing of goods and services by the

applicant. This income will benefit the citizens by increasing their incomes.

16. How will the increase in operational efficiency positively affect the socioeconomic condition of the area?

The proposed surface mining proposes to store the excess overburden created by the swell associated with earth moving, to the extent possible out of waters of the United States as defined by the corps of engineers. By minimizing in-stream activity the applicant has preserved the functions and values of the receiving waters. All mining highwalls will be eliminated and the area mined will be returned to the approximate original contour to preserve view sheds of the area impacted by mining. The applicant also proposes to auger the coal. This method of mining will reduce the amount of surface disturbance necessary to recover the coal economically.